REMARKS

Claims 14, 15, 16, 18, 19, and 21 are pending and under consideration. Claim 21 is amended herein. Claim 20 is canceled herein without prejudice or disclaimer. Support for the amendment to claim 21 may be found in claim 20 as filed originally. Reconsideration is requested based on the foregoing amendment and the following remarks.

Response to Arguments:

The Applicants appreciate the consideration given to their arguments, and the new grounds of rejection. Further favorable consideration is requested.

Claim Rejections - 35 U.S.C. § 103:

Claim 14, 15, 16, 18, 19, and 21 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 3,634,705 to Fedei (hereinafter "Fedei") in view of U.S. Patent No. 4,578,962 to Dustmann (hereinafter "Dustmann"). The rejection is traversed to the extent it might apply to the claims as amended. Reconsideration is earnestly solicited.

The last clause of claim 21 recites:

Said machine further comprising flow paths for air cooling.

Neither Fedei nor Dustmann teach, disclose, or suggest "said machine further comprising flow paths for air cooling," as recited in claim 21. Fedei, rather, provides gas cooling, not "flow paths for air cooling" as recited in claim 21. In particular, as described in column 3, lines 42-52:

> The housing 13 of the machine is made is nearly gastight as possible, and is filled with a suitable coolant gas, preferably hydrogen, which is used in the illustrated embodiment for cooling the rotor and the stator core. A blower may be mounted on the rotor shaft for circulating the gas within the housing and suitable baffles and ducts may be provided in the housing to control and direct the flow of gas therein. The gas in the machine is maintained at a suitable static pressure which may for example be from 30 to 75 pounds per square inch above atmospheric pressure, although other gas pressures might be used depending on the desired rating of the machine.

Since Fedei provides gas cooling, Fedei has no "flow paths for air cooling" as recited in claim 21.

At page 1, in paragraph [0005] of the subject application appears a reference to

""Proceedings of the American Power Conference", Volume 39, Chicago 1977, pages 255 to 269, in which is used a gastight housing. A corresponding housing is also provided in Fidei, as described above. In the claimed invention, such a housing does not appear because of the required sealing problem. The claimed invention, consequently, requires a lower expenditure, as described at page 2, paragraph [0008] of the subject application. Thus, it is deemed advantageous to combine air cooling with a thermosiphon cooling (cf. page 6, paragraph [0031]) of the subject application. The air circulation is to be effectuated in a known manner, whereby reference is made to EP 0 853 370 A1 and EP 0 522 210 A1 (cf. the mentioned paragraph on page 7). These patents disclose very clearly that therein the air circulation is to be effectuated through a not closed housing.

Dustmann, for its part, does not describe applying such a cooling system to an engine. Rather, in Dustmann, a superconducting winding of a (stationary) magnet is cooled with the Dustmann cooling system (cf. column 1, lines 5-9 and 28-32). The stator winding of an electric machine, as provided for in the object of the subject application, on the other hand, deals with a regular conducting winding. This fact can be unavoidably gathered from the fact that an additional air cooling was going to be provided. It is known that no superconducting winding can be cooled by means of air cooling. That means that Dustmann cannot give any indication with respect to a combination of a thermosiphon cooling with "flow paths for air cooling" as recited in claim 21, either, and thus Dustmann cannot make up for the deficiencies of Fedei with respect to claim 21 in any case.

The 11th clause of claim 21 recites:

> The coolant is circulated by a thermosiphon effect with boiling and vaporizing, the coolant being heated or partially vaporized in the discrete coolant areas and being flowing by natural convection without mechanically pumping.

Neither Fedei nor Dustmann teach, disclose, or suggest a "coolant is circulated by a thermosiphon effect with boiling and vaporizing, the coolant being heated or partially vaporized in the discrete coolant areas and being flowing by natural convection without mechanically pumping," as recited in claim 21. The Office Action acknowledges that Fedei does not show coolant circulated by a thermosiphon effect with boiling and vaporizing, the coolant being heated or partially vaporized in the discrete coolant areas, and seeks to compensate for it by combining Fedei with Dustmann, saying in the first full paragraph at page 4, that:

> At the time the invention was made, it would have been obvious to a person of

> ordinary skill in the art to replace circulation pump 55 of Fidei, US 3634705 with a thermosiphon system of Dustmann, US 4578962. One of ordinary skill in the art would have been motivated to do this so that no separate pump is needed.

The cooling technique according to Fedei, however, concerns a cooling system of a stator of an electric machine, in which in a closed system is effectuated a so-called "forced cooling" of a coolant in liquid or gaseous state. Therein is not contemplated an evaporation and a renewed condensation of the coolant, as in the claimed invention. A separate pump such as an external pump or compressor, rather, is absolutely necessary for the circulation of the coolant in Fedei. The cooling system of Fedei, conversely, would not function without such a pump/compressor. In particular, as described at column 4, lines 7-13:

> The coolant fluid for the stator winding is preferably a suitable liquid such as water and is circulated through the winding by means of an external pump 33. The pump circulates the coolant liquid discharged from the machine through a cooler 34 of any suitable type and through an entrance pipe 35 which passes through the housing 13 and is connected to the intake manifold 30.

It is submitted, therefore, that persons of ordinary skill in the art at the time the invention was made would not have been motivated to exchange such a forced cooling system of Fedei for thermosiphon cooling according to Dustmann, since the cooling system of Fedei would not function without a pump/compressor.

Fidei, moreover, *intends* to obtain effective cooling of the stator winding by providing a closed recirculating system which is entirely separate from the cooling system for the rotor and stator core. In particular, as described at column 4, line 16-20:

> In this way a closed recirculating system is provided which is entirely separate from the cooling system for the rotor and the stator core, so that more effect of cooling of the stator winding can be obtained.

The cooling system of Fedei will not operate without a pump, as discussed above, and consequently the dynamoelectric machine of Fedei will overheat if it is run without a pump. The dynamoelectric machine of Fedei is not meant to overheat, since then it could not cool a stator. Thus, modifying Fedei as proposed in the Office Action would render Fedei unsatisfactory for its intended purpose of cooling a stator, as well as inoperable, in contravention of M.P.E.P. § 2143.01. As provided therein:

> If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125

(Fed. Cir. 1984).

Since the cooling system of Fidei could not cool a stator if it overheated, and the dynamoelectric machine of Fidei would only run without pump 55 until it overheated, modifying Fidei as proposed in the Office Action would render Fidei unsatisfactory for its intended purpose of cooling a stator. There is thus no suggestion or motivation to make the proposed modification, *In re Gordon*.

Dustmann, for its part, describes no thermosiphon effect at all, and thus cannot make up for the deficiencies of Fedei with respect to claim 21 in any case. Dustmann, rather, appears to provide cooling by convection, not a thermo-siphon effect, to a superconducting winding of a (stationary) magnet, as described at column 1, lines 5-9 and 28-32. In the case of a stator winding of an electric machine, as provided for in the object of our application, it deals with a regular conducting winding. This fact can be unavoidably gathered from that an additional air cooling was going to be provided. It is known that no superconducting winding can be cooled by means of air cooling. That means that Dustmann cannot give any indication with respect to a combination of a thermosiphon cooling with an air cooling. Dustmann, in fact, actually teaches away from the claimed invention at column 1, lines 18-27, when he notes that there is a danger of instabilities occurring when a two-phase helium is used for cooling.

The ninth clause of claim 21 recites:

> Said cooling line system thermally coupling said cold head to the heat generating parts of said stator to be cooled with the stator winding, having discrete coolant areas associated with the heat generating parts of said stator to be cooled and being thermally conductively connected over a large area to the stator parts to be cooled.

Neither Fedei nor Dustmann teach, disclose, or suggest a "cooling line system thermally coupling said cold head to the heat generating parts of said stator to be cooled with the stator winding, having discrete coolant areas associated with the heat generating parts of said stator to be cooled and being thermally conductively connected over a large area to the stator parts to be cooled," as recited in claim 21.

Fedei, in fact, mentions no cold head at all, let alone a "cooling line system thermally coupling said cold head to the heat generating parts of said stator to be cooled with the stator winding, having discrete coolant areas associated with the heat generating parts of said stator to be cooled and being thermally conductively connected over a large area to the stator parts to be

cooled," as recited in claim 21.

Similarly, in Dustmann, coil form 10, including the feed canal 11, the collecting canal 12 as well as two cooling canals 13, are shielded all around by cold shields 27, 28, rather than being "discrete coolant areas associated with the parts of said stator to be cooled," as recited in claim 21. In particular, as described at column 3, lines 27-33.

> In FIG. 2, the feed canal 11, the collecting canal 12 as well as two cooling canals 13 can be seen. Although not shown in FIG. 1, in FIG. 2 the magnet winding 25 and the winding body or coil form 10 are shielded all around by cold shields 27, 28, and the entire system is mounted in a vacuum container formed of an inner jacket 29 and an outer jacket 30.

Thus, even if Fedei and Dustmann were combined, as proposed in the Office Action, the claimed invention would not result. Claim 21 is submitted to be allowable. Withdrawal of the rejection of claim 21 is earnestly solicited.

Claims 14, 15, 16, 18, and 19 depend from claim 21 and add additional distinguishing elements. Claims 14, 15, 16, 18, and 19 are thus also submitted to be allowable. Withdrawal of the rejection of claims 14, 15, 16, 18, and 19 is earnestly solicited.

Conclusion:

Accordingly, in view of the reasons given above, it is submitted that all of claims 14, 15, 16, 18, 19, and 21 are allowable over the cited references. There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is invited to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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